

Nucleotide sequence of transfer RNA genes from the linear mitochondrial DNA of the yeast *Williopsis mrakii* and *Pichia pijperi*

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In most species of yeast, the mitochondrial DNA (mtDNA) is a circular molecule. Only two species have been reported to have a linear mtDNA (*Williopsis mrakii*, synonym *Hansenula mrakii*

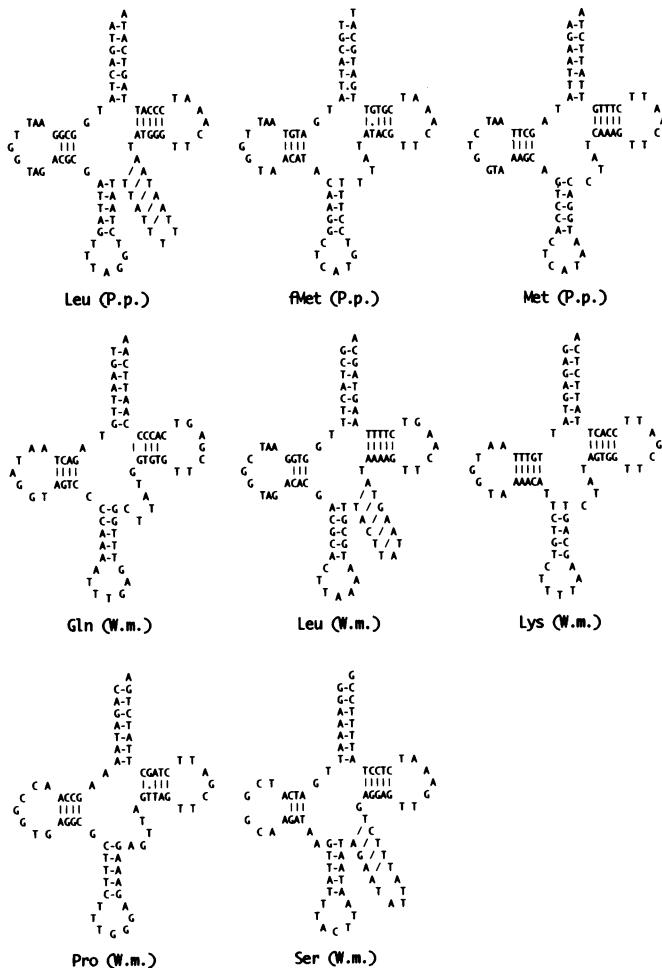


Figure 1. Transfer RNA gene sequences in *P. pijperi* (P.p.) and *W. mrakii* (W.m.) mitochondrial DNAs, presented in cloverleaf form of tRNA.

) and *Candida parapsilosis* (2)). After a systematic survey we have found that many other species of yeast have also a linear form of mtDNA. As these genomes lead us to ask questions about their origin, we analyzed several tRNA genes in the linear mtDNA of *W. mrakii* and *Pichia pijperi* (Figure 1). We found that the gene divergence between *W. mrakii* and the circular *Saccharomyces cerevisiae* and *Kluyveromyces lactis* mtDNAs was not significantly greater than the difference between the two circular mitochondrial genomes (identity more than 80% in average). *P. pijperi* tRNA genes seem to be somewhat more divergent from the circular DNAs (60–81% identity). No specific traits of change were detected in the genes of linear mtDNA. Analysis of protein coding sequences (cytochrome oxidase subunit 2 gene of *W. mrakii* and apocytochrome b gene of *P. pijperi*, not shown) suggested that the linear genomes use a standard yeast mitochondrial code. Figure 2 indicate the map position of the tRNA genes in the mitochondrial genomes. The linear structure of *Pichia pijperi* mtDNA will be fully described elsewhere.

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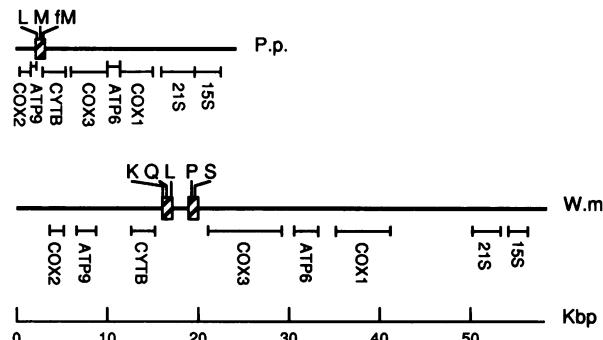


Figure 2. Map position of tRNA genes in *P. pijperi* and *W. mrakii* mitochondrial genomes. Single-letter amino acid codes are used to indicate tRNA genes.

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